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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/510,397
Filing Date: July 14, 2005
Appellant(s): WIEDENMANN ET AL.

Clifford A. Ulrich
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed January 7, 2010 appealing from the Office action mailed May 11, 2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

DE 198 38 466	LENFERS et al	2-2000
US 3,949,551	EICHLER et al	4-1976

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 8-21 are rejected under 35 U.S.C. 103(a) as being obvious over LENFERS et al (DE 198 38 466, rejections are based on US 6301951 as the English equivalent to this document) and EICHLER et al (US 3,949,551).

Regarding the preamble of claim 8, LENFERS et al teaches an oxygen sensor in an exhaust engine, as stated in the abstract. LENFERS et al teaches in the only figure a Nernst cell (12) with a measurement electrode (16) and reference electrode (18) contained in the reference canal (30). The pump cell (14) has an outer electrode (40) and inner electrode (38) separated from the exhaust gas by the diffusion barrier (22).

Regarding claim 8 limitations, LENFERS et al teaches the application of voltage to a pump cell in c. 3, l. 40-42 (of the English translation of LENFERS et al). LENFERS et al states the pump voltage being cathodic or anodic to correspond to the lean or rich range of fuel-air ratio in c. 3, l. 42-45, citing cathodic current during lean operation in c. 3, l. 67 – c. 4, l. 1. This obviously causes aniodic current to flow during rich operation. LENFERS et al teaches a rich drift to occur

during lean conditions (c. 3, l. 67 – c. 4, l. 9) which is offset by reverse polarity pulses of the pump voltage in c. 4, l. 18-26.

LENFERS et al fails to teach the engine to be in lean operation during the warm-up phase or during the duration of a secondary fuel injection.

EICHLER et al teaches in figure 3 and in column 2, lines 13-16 for the engine and in turn the sensor to be in the lean phase during warm up.

Because LENFERS teaches that the reverse polarity pulses eliminates polarity on the electrodes during extended periods of lean operation (c. 4, l. 44-47), then it would have been obvious to one possessing ordinary skill in the art at the time the invention was being made to also utilize these pulses during other extended periods of lean operation, such as the during an initial warm-up lean operation like shown by EICHLER, so as to prevent the polarization of the electrodes during these other lean operations as well.

Regarding claim 9, LENFERS et al explains in c. 3, l. 59-67 that while the pump voltage is at constant amplitude, a timer responds with a signal. The timer controls the pulse width, via the switching means, before reversal of polarity provided. (c. 4, l. 20)

Regarding claim 10, LENFERS et al teaches in column 4, lines 26-32 the time ranges and pulse applications to be dependent on the voltage. Therefore, if the pulse time is set, the voltage would need to vary, to maintain accurate readings.

Regarding claims 11-16, the manipulation of the frequencies are said to be variable in column 4, lines 32-36 of LENFERS et al. Therefore, it would be obvious to one of ordinary skill in the art to operate the pulses with a frequency which will best depolarize the electrode, decreasing the rich drift.

Regarding claims 17-19, it would be obvious to one of ordinary skill in the art for the temperature of the engine and in turn the exhaust gases and sensor to increase in temperature as the engine warms up.

Regarding claims 20 and 21, LENFERS et al teaches in claims 4 and 6 for the reversal of polarity to occur during predominate anodic currents (rich operation as defined in the above rejection of claim 8) in claim 4 and cathodic currents (lean operation as defined in the above rejection of claim 8) in claim 6. It would be obvious for operation to continue during both operation conditions.

(10) Response to Argument

1. Appellant argues Lenfers teaches the application of polarity reversal only during "long-term" lean operation and is therefore inapplicable as a reference to the "short-term" application of polarity reversal.

a. Lenfers isn't clear or absolute as to what exactly defines "long-term" and the terms "long-term" or "short-term" are relative. Moreover, no definitive definition is supplied for this in the specification or the claims of the instant application, nor is the distinction made that the "warm-up phase of the lambda sensor" is only a "short-term" operation in either the specification or Eichler.

b. While Lenfers refers to the repeated application of polarity reversal during "long-term" lean operation, Lenfers only defines this time frame once in their patent, defining it to be "e.g. several hours". This is not a clear or definitive definition, but rather an example of application. The terms "long-term" or "short-term" are relative terms referencing two time frames which are not clearly delineated or absolute. Furthermore, the appellant provides no definition as to "short-term" or "long-term" operation in their specification or their claims, as these terms are not even present in the claims at hand. No teaching or clarification is provided by the appellant in any form which shows that rich drift, the purpose for which the polarity reversal is applied, only occurs during "long-term" operation or fails to occur during "short-term" operation. The claims do not distinguish between the two time frames nor does it make clear the patent coverage the appellants seek as they wish to patent the application of polarity reversal not only during "secondary fuel injection" or "warm-up" but rather during "short-term" lean operation as a whole. It is simply unclear how the operation of the engine at warm-up, as required by the claim, is defined to be a "short-term" operation when the relative conditions and time frames are ambiguous.

c. The time frames necessary for the operating conditions of an engine to occur are ever changing and relative as the time frames change depending on a series of conditions including environmental factors making it inaccurate to require warm-up to definitively be a "short-term" operation. For example, warm up of the engine occurs much faster in a car present in a warm climate versus a car engine present in a cold climate. Although both vehicles (the one in the warm climate and the one in the cold climate respectively) are performing the same step, the duration of time needed to perform these steps is relative to each other and their climate. Therefore, one cannot always define warm-up as being a "short-term" or "long-term" operation but instead should be looked at as simply a time when the vehicle is in lean operation, as agreed upon by Lenfers, Eichler and the applicant, and therefore at risk for rich drift. It is in response to this rich drift that the polarity reversal of Lenfers would be beneficial during any time period.

d. While it is unclear what defines "short-term" or "long-term" operation, warm-up can be seen as both as operating in both time periods. The warm-up as a "short-term" operation can be seen in the car present in the warm climate, as the car will spend less time in lean conditions. Warm-up can be seen as a "long-term" operation in the car from the cold climate or after a car sits parked for several hours. For example, prior to start up a parked car will sit for hours in lean operation, where the amount of air present in the engine will largely surpass the amount of fuel present in the engine. Therefore, this "long-term" lean condition

when warm-up occurs upon engine starting would constitute a "long-term" lean condition applicable for polarity reversal as disclosed by Lenfers. Since warm-up can be shown to be a "short-term" or "long-term" lean condition, there is no reason the application of polarity reversal of Lenfers would be inapplicable during any lean operation, as it is this lean operation which is prone to the problematic rich drift which polarity reversal can combat.

2. Appellant argues no support is provided by the examiner for the proposition that there is a reasonable expectation of success to "apply repeated reversals of polarity to "short-term" lean operation".

e. The examiner would first like to point out that the application of "repeated reversals of polarity" is not required by the claim language to occur during "short-term lean operation", but rather during warm-up, an event which occurs in the engine which is not required to be either "short-term" or "long-term". Furthermore, in view of the arguments stated above and the claims as currently pending, the examiner doesn't see why making the differentiation between the "short-term" or "long-term" time periods is a definitive difference between the art and arguments of the appellant.

f. In reference to the appellant's submitted argument, the examiner has repeatedly stated that the combination of Lenfers and Eichler clearly shows that the application of polarity reversal during lean operation, which rich drift is prone to occur, would clearly be beneficial to the operation and efficiency of the sensor. Since Lenfers teaches the reversal of polarity during lean operation when rich

drift to predisposed to occur and Eichler teaches warm-up to occur during lean operation, there is no doubt that the switching of the polarity would be a preventative measure which would allow for the more effective operation of the sensor. The appellant in turn has argued relative time periods and hindsight bias, but has failed to provide a prima facia case this combination would be ineffective as the terminology used in their arguments is never defined in their own specification or claims. Furthermore, the appellant has argued and cited a portion of their specification at the bottom of page 5 to the top of page 6 of their brief stating that that it is the dynamic conditions which are different, but none of the points listed in this citation are claimed or reflected in the claimed operation method in any way. It is unclear if this is what the appellant is attempting to seek patent coverage for or if it is in fact the application of polarity reversal during the warm-up phase of the sensor. There is also no basis provided for the argument which differentiates the "short-term" or "long-term" delineation being necessary for the warm-up condition as no teaching or remarks are provided by the appellant which show that rich drift, the purpose for which the polarity reversal is applied, only occurs during "long-term" operation or fails to occur during "short-term" operation. Therefore, it is with more than a reasonable expectation of success the combination of Lenfers and Eichler teaches the application of polarity reversal during warm-up lean operation.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Kourtney R Salzman/

Examiner, Art Unit 1795

3/24/2010

Conferees:

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